Photo: Mike Reynolds

Share the Beach

Alabama Sea Turtle Nest Monitoring Program

2003 Annual Report

Jereme N. Phillips
Bon Secour National Wildlife Refuge
12295 State Highway 180
Gulf Shores, AL 36542

December 2003

2003 Alabama Sea Turtle Nesting Report

Jereme N. Phillips, U.S. Fish and Wildlife Service, Bon Secour National Wildlife Refuge, 12295 State Highway 180, Gulf Shores, AL 36542.

Abstract: A sea turtle nesting survey was conducted on the 45-mile Alabama Gulf coast during the summer of 2003. 62 loggerhead (*Caretta caretta*) nests were located, marked, and monitored from Dauphin Island (Mobile County) east to Alabama Point (Baldwin County) near the Florida state line. Of 116 sea turtle tracks or "crawls" discovered, 58 (50.0%) were false crawls with no eggs deposited.* The mean incubation period was 63.8 days. An estimated 3,185 hatchlings, representing 55.8% of the total eggs deposited and 98.2 % of the total eggs hatched, successfully reached the Gulf of Mexico.

Introduction

In 1994, Bon Secour National Wildlife Refuge (NWR) began monitoring sea turtle nesting on the Fort Morgan Peninsula along the western Alabama Gulf coast. Sea turtle nests were located and marked but estimates of hatchling survival were difficult due to limited availability of personnel. Annual systematic surveys of the remaining 30 miles of Alabama beaches were not conducted. In 2001, volunteers and the U.S. Fish and Wildlife Service (USFWS) Daphne Ecological Services Field Office led an effort to establish a sea turtle monitoring program on private lands in Alabama. This effort was in response to widespread reports of hatchlings that had become disoriented from artificial lighting along Alabama State Highway 182 in the cities of Gulf Shores and Orange Beach. As a result, Share the Beach, a program that currently has more than 200 volunteers, was born. The program is currently administered by Bon Secour NWR and supported by a consortium of state, federal, and local agencies, private citizens, and environmental organizations. Principals include the Alabama Department of Conservation and Natural Resources (ADCNR) Coastal Section, Gulf State Park (ADCNR), Alabama Gulf Coast Convention and Visitors Bureau, Friends of Bon Secour NWR, and the Daphne Ecological Services Field Office (USFWS).

The objectives of the Share the Beach Program are:

1. *To monitor sea turtle nests and hatchlings on the Alabama Gulf coast*
2. *To mitigate human-related sea turtle mortality, especially the effects of artificial light pollution, by assisting hatchlings to the Gulf of Mexico through the presence of volunteers*
3. *To promote the conservation of sea turtles in Alabama through public outreach and education*

Three species of sea turtles, the loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempi*), and green turtle (*Chelonia mydas*) are known or suspected to nest in Alabama. Loggerheads represent 95-100% of sea turtle nests in the state each year and all nests in 2003 were of confirmed or suspected loggerheads. Kemp's ridleys have been confirmed nesting in Alabama (2001) and green turtles may nest in the area occasionally but are unconfirmed. The leatherback (*Dermochelys coriacea*) is known to occur in Alabama waters through strandings and other observations but does not nest in the state. Additionally, the hawksbill (*Eretmochelys imbricata*) may occur off the coast of Alabama but its status in this area is unclear.

* does not include 4 nests where eggs or hatchlings but no crawls were found

Study Area

Sea turtle nesting surveys were conducted on public and private lands on the entire Alabama Gulf coast, from Dauphin Island at the western boundary east to the Florida state line. Public lands surveyed include Bon Secour NWR (USFWS), Gulf State Park (ADCNR), Fort Morgan State Historic Park (Alabama Historical Commission), and public beaches owned by the cities of Gulf Shores, Orange Beach, and Dauphin Island. Private lands surveyed contained undeveloped areas, single and multi-family homes, condominiums, and commercial businesses.

To facilitate volunteer surveys, the Alabama Gulf coast was divided up into 9 geographic areas, or teams, totaling approximately 45 miles (72.4 kilometers) including (from west to east):

1) Dauphin Island (15 mi./24 km.)
2) Fort Morgan—including Bon Secour NWR (15 mi./24 km.)
3) Laguna Key—from eastern boundary of Bon Secour NWR to Little Lagoon Pass (3 mi./4.8 km.)
4) West Beach II—residential area of West Beach east of Little Lagoon Pass (1 mi./1.6 km.)
5) West Beach I—condominiums of West Beach east to State Hwy. 59 (1 mi./1.6 km.)
6) Gulf Shores—from State Hwy. 59 east to Gulf State Park (1 mi./1.6 km.)
7) Gulf State Park (2 mi./3.2 km.)
8) Orange Beach—from the eastern boundary of Gulf State Park to Perdido Pass (5 mi./8 km.)
9) Alabama Point—from Perdido Pass east to the Florida state line (2 mi./3.2 km.)

Habitats used by nesting sea turtles in Alabama include peninsular and island beaches and their associated primary dunes. Many of the highly developed areas have lost the dune component to their beaches and the sand is frequently renourished or scraped resulting in habitat that is less desirable to nesting sea turtles. In 2003, 79% of sea turtle nests were located in the Fort Morgan, Laguna Key, and Alabama Point areas (Figure 1).

Methods

Nesting surveys were conducted each morning from May 1 through September 6. On Dauphin Island, the eastern developed end of the island was surveyed on foot. A four-wheel drive sport utility vehicle was used to survey the undeveloped, western 9 miles (14.5 km) of the island. The Fort Morgan Peninsula, including Bon Secour NWR, was surveyed with an all-terrain vehicle. All other areas of the Alabama Gulf coast were surveyed on foot, usually by 1-2 volunteers each morning.

Surveys typically began between 0500 and 0600 hours (CST) and lasted for approximately 2 hours, depending upon the length of the survey area. While patrolling the beach, participants searched for sea turtle tracks, or "crawls," to indicate a possible nest. The scene was sketched on the back of a standardized data form to indicate direction of crawl, track appearance, obstacles, mound location, and any other significant information. Data forms also included fields for recording date, time, location, personnel, measurements from wrack line and dunes, determination of false crawl or nest, and information about nest relocation. For sea turtle crawls that included a mound or other disturbance, participants verified the presence or absence of eggs. Nests that were found near the wrack line or faced human threats (e.g. beach renourishment projects) were relocated. Upon verification of eggs, nests were covered with sand and marked with 4 stakes, flagging, and signs. Universal Transverse Mercator (UTM) coordinates of each nest were also marked by refuge personnel using a Global Positioning System (GPS).

After 55 days of incubation, tarp was added to 3 sides of each nest to reduce artificial light. The tarp extended approximately half-way between the nest and the water. In addition, a trench was dug and maintained from the nest to the water to help prevent the loss of hatchlings due to disorientation from artificial light. For most nests, volunteers or refuge staff was present to assure that nearly all emerged hatchlings made it safely to the Gulf of Mexico. Once 2-3 days passed after the last emergence or after 75 days of incubation if there was no emergence, the nest was excavated. Nest excavations were conducted with refuge staff present but often with significant contributions from volunteers. Data collected at time of excavation included estimated totals of eggs, live hatchlings, dead hatchlings, dead embryos, pipped eggs, infertile eggs, and emerged hatchlings.

Personnel

Survey participants included more than 200 volunteers, 6 staff members and 5 interns from Bon Secour NWR, and 3 staff members from Gulf State Park. Program volunteers donated more than 4,000 hours to the Share the Beach program. This effort included nest surveys, administrative duties (e.g. record-keeping, e-mailing), and public outreach, such as distribution of literature and presentation of sea turtle programs.

Results and Discussion

Weather

Weather during the 2003 sea turtle nesting season was marked by significant rainfall. During June, July, and September, rainfall amounts were a cumulative 19 inches above the 55-year average for the area (Figure 2). Many nests hatched after incubation periods of more than 70 days (Figure 3). While only one tropical storm made landfall in the central Gulf of Mexico (T.S. Bill), this storm had a strong impact on nests in Alabama because of its timing during the middle of the nesting season and most of the associated rainfall and storm surge occurred in Mississippi and Alabama, east of its landfall in southeastern Louisiana. Besides direct washover of some nests from T.S. Bill, heavy rainfall throughout the season almost certainly reduced hatchability of eggs due to excessive cooling of the nest chamber. In 2003, relocation of some nests that were left *in situ* would certainly have resulted in increased hatchling survival since this year was marked by above-average rainfall; however, similar efforts in a drought year would likely result in decreased hatchling survival due to desiccation and excessive heating of the egg chamber. In addition, since the sex of sea turtle hatchlings is determined by temperature, a phenomenon known as temperature-dependent sexual differentiation (TSD), relocating all nests to higher ground would result in an unnatural male: female ratio of hatchlings. Sea turtle hatchlings may also have reduced fitness when removed from the specific environment of temperature, humidity, and gas exchange selected by the nesting female as learned from thousands of years of trial and error by her ancestors.

Data

Sea turtle nesting survey data for each area of the Alabama coast is summarized below. However, some clarification of methods used to summarize the data is necessary due to the many unknowns that are inherent in such a survey. Limitations with the data and assumptions used for summary purposes include:

1) If the nest was relocated, the total number of eggs was considered to be accurate. Also, when intact eggs, pipped eggs, dead hatchlings, or live hatchlings were found at the time of excavation, these numbers were considered to be accurate. Other data, such as number of hatched turtles, were adjusted to fit with these "knowns."

2) Undiscovered nests (some hatchlings are discovered but the nest is never located) are described in a separate section of this report but are not included in the summary data for each area of the coast since there are many unknowns associated with these nests. The only exception is that total number of nests for each area and for the entire Alabama coast includes undiscovered nests. Two nests that were not excavated because of beach erosion (A-22, A-26) are not included in summary data. Neither of these nests were considered viable since they were lost near day 75 of incubation and had showed no signs of hatching.

3) For monitored nests, the number of emerged hatchlings counted on the beach is considered accurate unless the number of hatched eggs determined at excavation is substantially greater (i.e. ≥10). In this case, the assumption will be made that some turtles hatched when no observers were present (e.g. during daylight hours) and that all made it safely to the water unless that nest had a history of disoriented hatchlings escaping from the trench.

Dauphin Island. In 2003, volunteers searched the island for sea turtle nests for the first time. As a result, this season marked the first year that all 45 miles of Alabama coastline were surveyed. The western 9 miles of Dauphin Island is privately owned and undeveloped. One nest (**J-1**) was found in this area near the western tip of the island and was relocated since it was found below the wrack line (and in water). This nest did not hatch due to early embryonic death. The eastern 5 miles of the island contains residential development and one nest (**J-2**) was found in this area. This nest had a successful hatch with approximately 128 hatchlings making it safely to the water (48.7% survival). The mean incubation period for Dauphin Island was 58 days.

ID #	Date found	Relocated	# Eggs	1st Emergence	# to water	Alive in nest[1]	Dead in nest[2]	Hatched	Dead embryo	Infertile	Survival (%)
J-1	5/26/03	Yes	121*		0	0	0	0	112	8	0
J-2	6/20/03	Yes	142	8/17/03	128	4	4	132	0	10	90

[1] includes hatchlings found alive or pipped live
[2] includes hatchlings found dead or pipped dead
* one egg was unaccounted for at excavation

Fort Morgan. In 2003, there were 27 nests on the Fort Morgan Peninsula (Figures 4 & 5). Of these nests, 16 were located within Bon Secour NWR. Nesting primarily occurred at the western and eastern ends of the peninsula. Fifteen of the 26 discovered nests hatched (2 nests had <10 hatchlings) including **A3**, **A4, A6, A8, A10, A11, A13, A14, A15, A16, A18, A19, A21, A23, A24**. Overall hatchability was poor, and 11 nests did not hatch including **A1, A2, A5, A7, A9, A12, A17, A20, A22, A25,** and **A26**. Of 1491 unhatched eggs, 652 (44%) contained dead embryos and 839 (56%) were determined to be infertile or no embryo was found. Some of the low survival can probably be attributed to the extreme weather conditions this year, particularly cooling due to high rainfall and to a lesser extent, tropical storms. However, infertile eggs were common in 2003 and the failure of many nests cannot be clearly attributed to weather. An estimated 852 hatchlings made it safely to the Gulf of Mexico (35.8% survival). The mean incubation period for Fort Morgan nests was 64.9 days.

Nest A-23, located just east of the Fort Morgan Unit of the refuge near The Dunes subdivision, was identified as a possible green turtle nest when discovered. Although the tracks found near the nest were similar to a green turtle, the hatchlings showed nearly all of the characteristics of loggerheads. Some intriguing traits of 4 live hatchlings found during the nest excavation included 4 inframarginal scutes on the plastron (loggerheads usually have 3, but occasionally have 4) and first costal scutes did not touch the nuchal scutes on one side of the carapace on some individuals. These characteristics probably represent natural variation in loggerheads, however, loggerhead x green turtle hybrids are known to occur so a dead hatchling found during excavation was saved as a specimen for further study.

On August 6, 2003, a loggerhead sea turtle that had been tagged with a satellite transmitter nested at Bon Secour NWR (nest A-25). The female, nicknamed "Amie," had been tagged two weeks earlier by researchers at Gulf Islands National Seashore (NS), Florida. National Park Service personnel notified the refuge about the satellite data, which also indicated that this female had nested in the Fort Pickens area of the National Seashore on the night following her capture. Just 3 days after nesting at Bon Secour NWR, transmissions from the turtle were lost and its fate was unknown for more than 2 months. On October 20, a diver that was inspecting artificial reefs offshore found Amie's transmitter at the bottom of a reef near a large sea turtle carcass. The transmittered turtle was assumed dead, however, after Gulf Islands NS personnel viewed a video made of the reef inspection, it was determined that the carcass was probably not Amie since it was lacking a characteristic shark bite scar that had been noted upon her capture. Park personnel believe that Amie lost her transmitter while trying to get underneath the artificial reef but may have survived. The second sea turtle was apparently able to get underneath the reef in an area where the sea floor had eroded and could not escape. Escambia County, Florida, is currently reviewing the design of this particular type of reef so that it does not trap any more turtles. While Amie's nest in Alabama was not successful in 2003, her nest two weeks earlier in Florida produced 115 hatchlings that made it safely to the Gulf of Mexico.

ID #	Date found	Relocated	# Eggs	1st Emergence	# to water	Alive in nest[1]	Dead in nest[2]	Hatched	Dead embryo	Infertile	Survival (%)
A-1	5/10/03	Yes	116	----	0	0	0	0	112	4	0
A-2	5/17/03	Yes	83	----	0	0	0	0	46	37	0
A-3	5/20/03	Yes	92	7/26/03	87	0	0	87	3	2	95
A-4	5/25/03	Yes	123	8/14/03	5	0	3	6	89	26	4
A-5	5/31/03	No	81	----	0	0	0	0	80	1	0
A-6	6/10/03	No	111	8/20/03	25	0	1	25	60	25	23
A-7	6/17/03	No	119	----	0	0	0	0	0	119	0
A-8	6/18/03	No	105	8/22/03	59	1	3	62	1	42	56
A-9	6/19/03	Yes	98	----	0	0	0	0	2	94	0
A-10	6/21/03	No	86	----	0	0	2	1	9	75	0
A-11	6/23/03	Yes	107	8/26/03	15	0	0	17	0	90	14
A-12	6/26/03	No	117	----	0	0	0	0	0	117	0
A-13	6/29/03	No	99	8/31/03	92	0	0	92	0	7	93
A-14	6/29/03	No	74	8/26/03	70	2	2	71	0	2	95
A-15	7/3/02	No	95	9/5/03	67	0	0	67	4	24	71
A-16	7/4/03	No	100	8/30/03	67	0	4	67	3	29	67
A-17	7/8/03	No	53	----	0	0	0	0	1	52	0
A-18	7/9/03	No	112	9/5/03	104	0	2	105	2	4	93
A-19	7/14/03	Yes	85	9/15/03	22	0	1	23	7	55	26
A-20	7/18/03	No	88	----	0	0	0	0	86	1	0
A-21	7/18/03	No	116	9/14/03	89	0	9	94	13	5	77
A-22	7/21/03	No	*	----	0			0			0
A-23	7/22/03	Yes	101	9/17/03	81	4	3	84	2	15	83
A-24	7/28/03	No	107	9/30/03	69	0	1	73	29	4	64

A-25	8/6/03	No	114	----	0	0	0	0	103	9	0
A-26	8/16/03	No	*----	----	----	----	----	----	----	1	0

*nests lost to erosion
[1] includes hatchlings found alive or pipped live
[2] includes hatchlings found dead or pipped dead

Laguna Key. This area of the Alabama coast (Figure 5) had significant challenges this year as it was selected by the City of Gulf Shores for an emergency beach renourishment project in response to erosion from recent tropical storms. As a result, all of the nests found between the Laguna Key subdivision and the Little Lagoon Pass had to be relocated to beaches either within the subdivision or Bon Secour NWR. Laguna Key volunteers responded with a dedicated effort to get every sea turtle nest out of the impacted area. Twelve nests were successfully relocated (**B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-9, B-10, B-11, B-12, B-13**) and the Laguna Key Team received the Baldwin County Environmental Organization Responsibility Award from the Baldwin County Commission for their work. Only one nest (**B-8**) was found within the Laguna Key subdivision and did not have to be relocated. An estimated 1,114 hatchlings successfully reached the Gulf of Mexico (85.6% survival). The mean incubation period for Laguna Key was 63.2 days.

ID #	Date found	Relocated	# Eggs	1st Emergence	# to water	Alive in nest[1]	Dead in nest[2]	Hatched	Dead embryo	Infertile	Survival (%)
B-1	5/5/03	Yes	86	7/18/03	75	1	0	75	1	10	87
B-2	5/22/03	Yes	104	7/31/03	95	0	0	95	0	9	91
B-3	5/26/03	Yes	100	8/6/03	9	3	1	10	72	13	9
B-4	6/3/03	Yes	124	8/5/03	120	1	1	122	0	2	98
B-5	6/7/03	Yes	107	8/8/03	100	0	1	100	0	6	93
B-6	6/12/03	Yes	119	8/11/03	108	0	2	109	1	8	91
B-7	6/15/03	Yes	96	8/15/03	88	0	0	88	1	7	92
B-8	7/3/03	No	84	8/30/03	79	0	0	79	3	2	94
B-9	7/7/03	Yes	95	9/4/03	89	0	0	91	1	3	94
B-10	7/12/03	Yes	103	9/13/03	99	1	0	99	0	4	96
B-11	7/13/03	Yes	82	9/9/03	78	0	1	78	1	2	95
B-12	7/15/03	Yes	92	9/15/03	89	2	0	89	0	3	97
B-13	7/24/03	Yes	110	9/21/03	85	0	1	85	0	24	77

[1] includes hatchlings found alive or pipped live
[2] includes hatchlings found dead or pipped dead

West Beach II. Two nests were located and marked in the residential area of West Beach east of Little Lagoon Pass (Figure 6). Nest **C-1** had some inundation from T.S. Bill which may have affected hatchability while all eggs from nest **C-2** were determined to be infertile at excavation.

ID #	Date found	Relocated	# Eggs	1st Emergence	# to water	Alive in nest[1]	Dead in nest[2]	Hatched	Dead embryo	Infertile	Survival (%)
C-1	6/12/03	Yes	101	----	0	0	0	0	73	28	0
C-2	7/16/03	Yes	142	----	0	0	0	0	0	142	0

[1] includes hatchlings found alive or pipped live
[2] includes hatchlings found dead or pipped dead

West Beach I. This area, dominated by condominium developments west of State Highway 59 in Gulf Shores (Figure 6), had two nests this season, **D-1** and **D-2**. Both nests hatched and an estimated 193 hatchlings successfully reached the Gulf of Mexico (91.7% survival). The mean incubation period for West Beach I was 60 days.

ID #	Date found	Relocated	# Eggs	1st Emergence	# to water	Alive in nest[1]	Dead in nest[2]	Hatched	Dead embryo	Infertile	Survival (%)
D-1	6/9/03	Yes	96	8/7/03	88	0	0	88	1	7	92
D-2	6/22/03	Yes	97	8/23/03?	89	0	0	89	1	7	92

[1] includes hatchlings found alive or pipped live
[2] includes hatchlings found dead or pipped dead

Gulf Shores. Although this area was thoroughly searched by a dedicated team of volunteers, no nests were found between State Highway 59 and Gulf State Park (Figure 6). This is a highly used public beach that is scraped by heavy equipment each night during the summer.

Gulf State Park. Two nests were found in the area of the State Park west of Orange Beach (Figure 6). **G-1** was located just east of the Gulf State Park Hotel and Resort and was unsuccessful. An undiscovered nest (see "undiscovered" section) was also located in this area of the park. Near the pavilion, nest **G-2** had a successful hatch with an estimated 66 hatchlings reaching the water. Overall survival for Gulf State Park (Gulf Shores unit) was 37.1%. The incubation period for the discovered nest that hatched (G-2) was 68 days.

ID #	Date found	Relocated	# Eggs	1st Emergence	# to water	Alive in nest[1]	Dead in nest[2]	Hatched	Dead embryo	Infertile	Survival (%)
G-1	5/31/03	No	105	----	0	0	1	1	86	11	0
G-2	6/14/03	Yes	73	8/20/03	66	0	1	66	0	6	90

[1] includes hatchlings found alive or pipped live
[2] includes hatchlings found dead or pipped dead

Orange Beach. Three nests (**H-1, H-2, H-3**) were located in Orange Beach during the 2003 season, a large area that stretches from the eastern boundary of Gulf State Park (Gulf Shores) east to Perdido Pass (Figure 7). Two of the nests were reported to have crawls similar to green turtles but no hatchlings were positively identified. An estimated 175 hatchlings successfully reached the Gulf of Mexico (62.7% survival). The mean incubation period for Orange Beach was 66.5 days.

ID #	Date found	Relocated	# Eggs	1st Emergence	# to water	Alive in nest[1]	Dead in nest[2]	Hatched	Dead embryo	Infertile	Survival (%)
H-1	5/27/03	Yes	111	8/2/03	104	2	0	106	1	4	95
H-2	6/12/03	Yes	97	----	0	0	0	0	0	15	82
H-3	7/4/03	No	71	9/8/03	71	0	1	71	1	0	97

[1] includes hatchlings found alive or pipped live
[2] includes hatchlings found dead or pipped dead

Alabama Point. This area is located east of Perdido Pass to the Florida state line (Figure 8). Eight nests were discovered this year (**I-1, I-2, I-3, I-4, I-5, I-6, I-7, I-8**) and all successfully hatched. An estimated 673 hatchlings successfully reached the Gulf of Mexico (78.0% survival). Alabama Point was the only nesting area that had regular visits from red foxes. Fortunately, volunteers stood guard at the nests and as a result only 27 eggs (3.1%) were depredated despite the best efforts of the foxes, which were reported to be well-acclimated to people in this area. The mean incubation period for Alabama Point was 63.5 days.

#	Date found	Relocated	# Eggs	1st Emergence	# to water	Alive in nest[1]	Dead in nest[2]	Hatched	Dead embryo	Infertile	Survival (%)
I-1	5/20/03	Yes	99	7/29/03	57	0	10	64	27	3	65
I-2	5/23/03	Yes	121	8/1/03	95	2	7	102	13	6	79
I-3	6/8/03	Yes	137	8/1/03	81	1	5	86	36	16	59

I-4	6/21/03	Yes	115	8/23/03	108	4	5	108	0	2	94
I-5	7/2/03	Yes	140	9/4/03	88	0	5	93	4	4	63
I-6	7/3/03	No	110	9/3/03	107	1	1	108	0	2	97
I-7	7/22/03	Yes	86	9/27/03	87*	4	0	87	0	0	100
I-8	7/31/03	No	55		50	0	1	50	1	3	91

*# of hatchlings observed was > # of eggs counted
[1] includes hatchlings found alive or pipped live
[2] includes hatchlings found dead or pipped dead

"Undiscovered" nests. At least 4 nests hatched that were not found during surveys. In the Fort Morgan area (nest **A-27**), volunteers discovered disoriented hatchlings high in the dunes and along the roadside in the Ponce DeLeon area at the western end of the peninsula on August 23. Six dead turtles were found and 35 live turtles were found and safely released.

In the Laguna Key area (nest **B-14**), 1 live turtle was found and released and 6 dead turtles were found under a house west of Little Lagoon Pass on August 22.

The most significant report of predation this season occurred at nest **C-3** in the West Beach II area on August 9. Sixty depredated eggs and 2 dead hatchlings were found in the residential part of West Beach. Volunteers reported tracks of a fox or coyote at the nest.

At Gulf State Park, hatchlings from nest **G-3** were found near the hotel on September 13. Volunteers successfully assisted at least 46 hatchlings to the water and there were public reports of more successful emergences from this nest.

In total, at least 82 hatchlings from these 4 "undiscovered" nests successfully made it to the Gulf of Mexico through the efforts of volunteers. More than likely, 10% of nests are undetected by surveys each year due to weather or other factors and there were probably 2-3 (other than the known 4) additional nests that were missed in 2003.

Summary

Considering the significant challenges faced by Alabama's sea turtles this year, including heavy rainfall, tropical storms, beach renourishment projects, and continued habitat loss, the 2003 nesting season was successful. While hatchability was low due to natural causes, volunteers fulfilled the primary mission of the program by ensuring that 98.2% of hatched sea turtles made it safely to the Gulf of Mexico.

Acknowledgements

First and foremost, Bon Secour NWR would like to thank the more than 200 volunteers that form the backbone of Share the Beach and contribute their talents, time, financial support, and energy to sea turtle conservation in Alabama. In particular, the refuge would like to thank the Team Leaders for the 9 survey areas: Kent and Faye MacIntosh, Dennis and Donna Ellis, Barney Gass, Mike and Prissy Reynolds, Brenda Johnson, Kelly Reetz, CJ Harmon, Kris Hall, Nancy Crawford, Bill and Robin Chambers, and Herman and Peggy Lively.

Thanks to the generous Adopt-A-Nest donors who "adopted" 54 of the 58 discovered nests in 2003. Nineteen hatchlings were also adopted as part of this program. We are grateful for the dedication of Adopt-A-Nest program coordinator, Sonja Sanders, and Ralph Gilges, President of the Friends of Bon Secour National

Wildlife Refuge, an organization which administers the Adopt-A-Nest Program and supports the refuge in countless ways.

We would also like to acknowledge the members of the Sea Turtle Advisory Committee: Lyne Askins (Bon Secour NWR), Barbara Allen (USFWS Daphne Field Office), Carl Ferraro (Alabama Department of Environmental Management), Amy King (ADCNR Coastal Section), Ralph Gilges (Friends of Bon Secour NWR), David Cooper (Meyer Real Estate), Colette Boehm (Alabama Gulf Coast Convention and Visitors Bureau), Kelly Reetz (ADCNR Gulf State Park), Sonja Sanders (Friends of Bon Secour NWR, Adopt-A-Nest Program), and Mike Groutt (USFWS Daphne Field Office).

Special thanks to Sandy MacPherson, Larry Goldman, Mark Nicholas, interns and staff of Bon Secour NWR, the Baldwin County Commission, numerous donors, and the citizens of the Alabama Gulf coast who supported sea turtle conservation by allowing us to conduct surveys on their private lands.

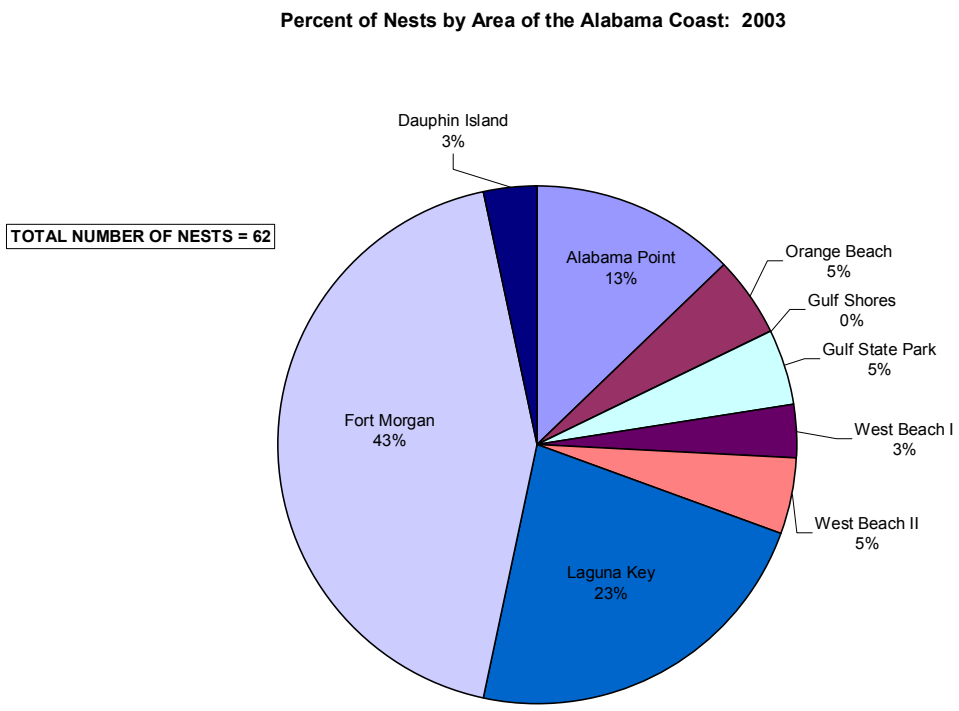
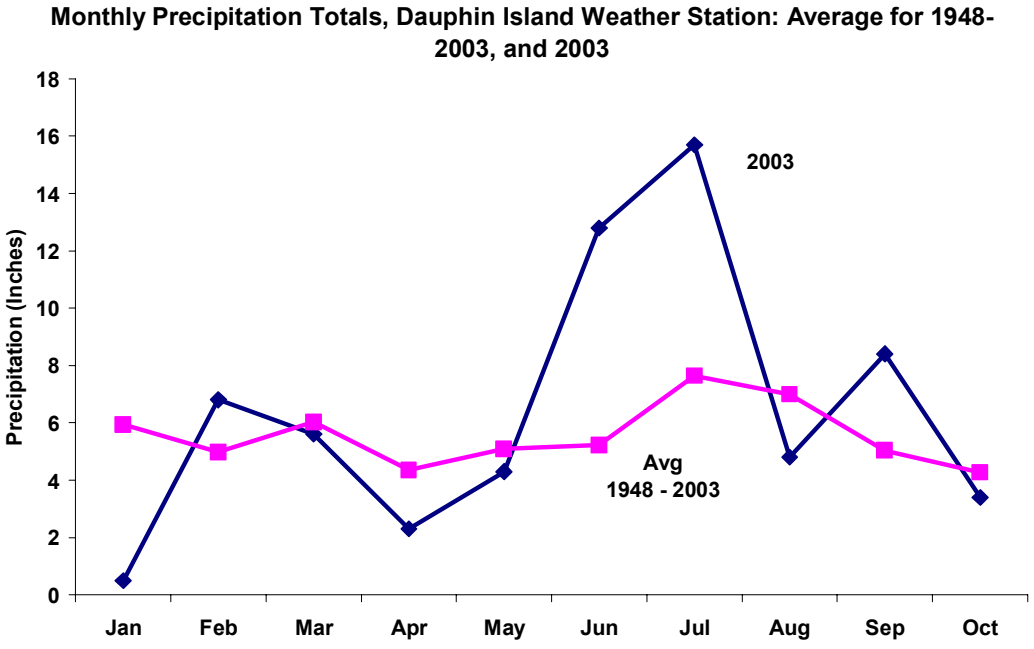


Figure 1.



Source: Southeast Regional Climate Center

Figure 2.

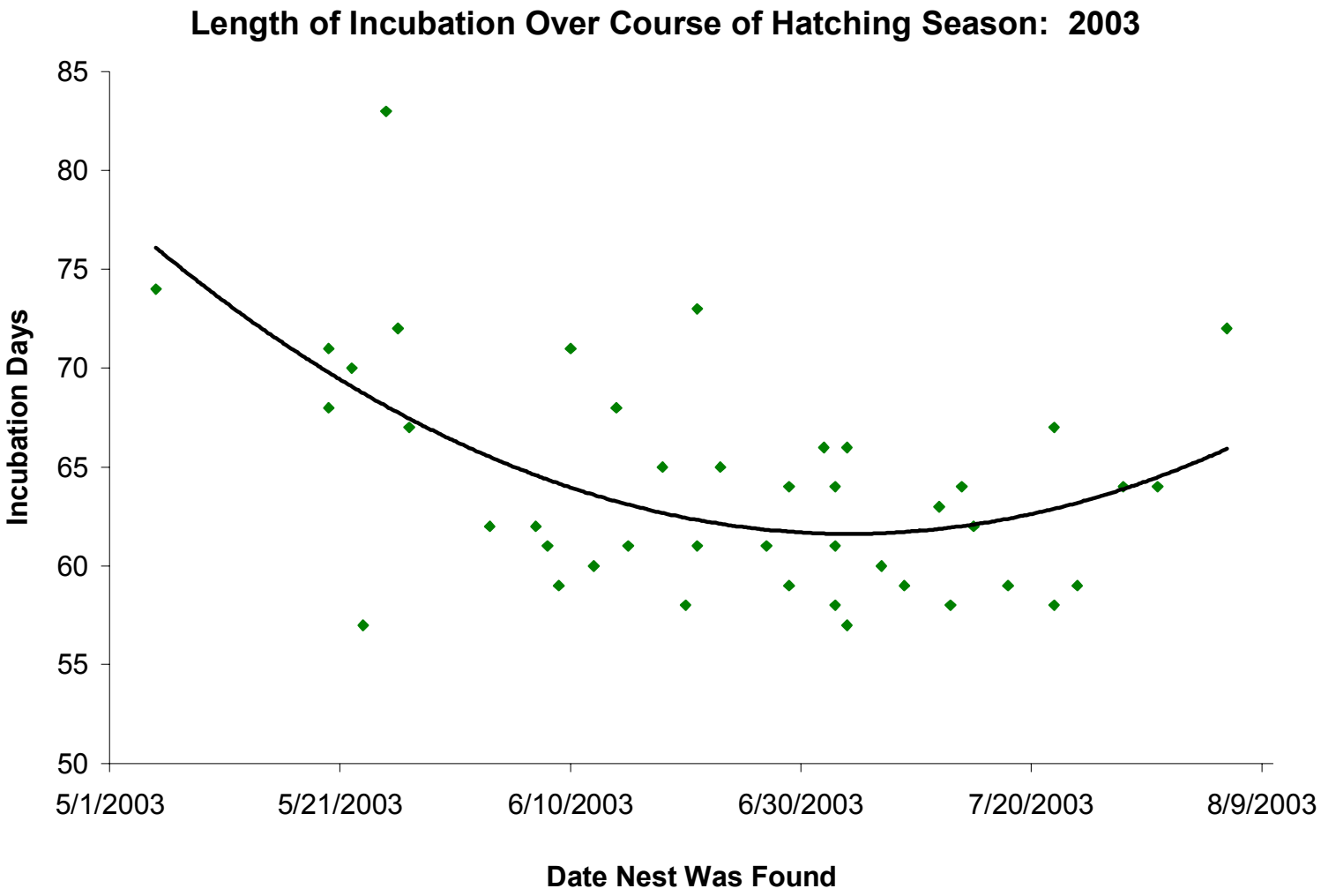
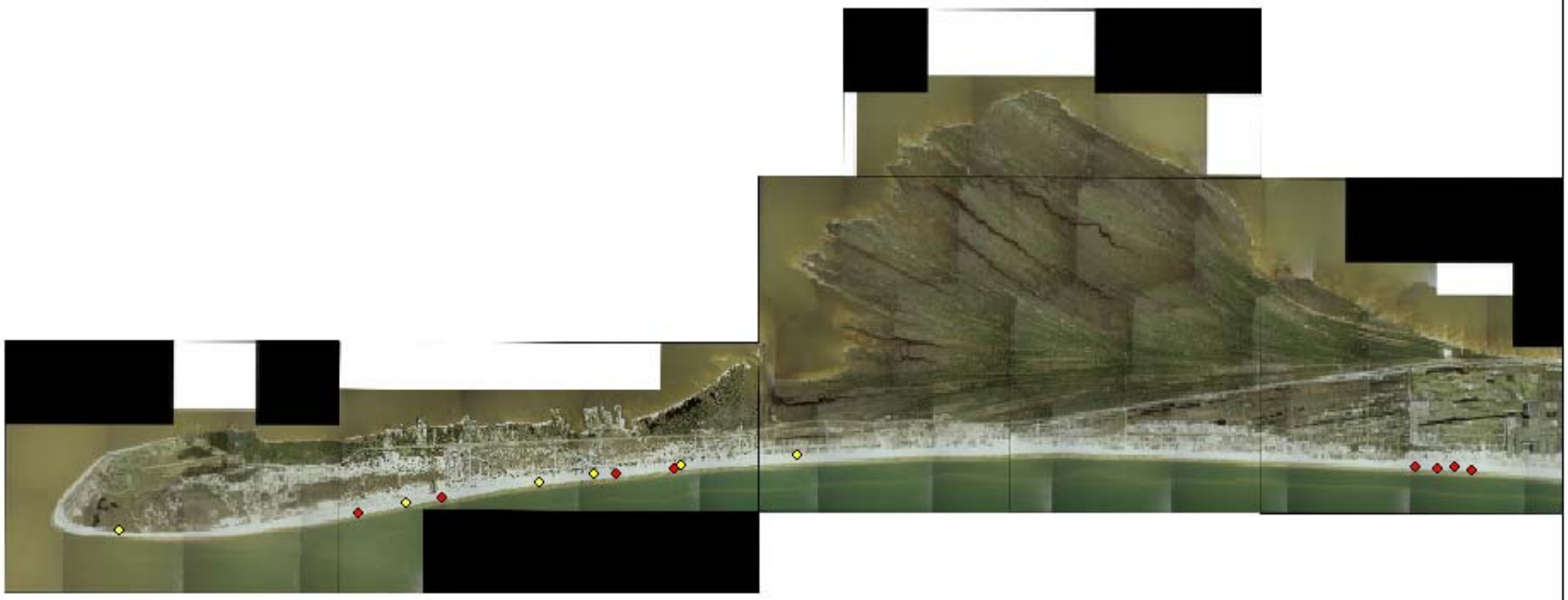

Length of Incubation Over Course of Hatching Season: 2003
Incubation Days
85
80
75
70
65
60
55
50
5/1/2003
5/21/2003
6/10/2003
6/30/2003
7/20/2003
8/9/2003
Date Nest Was Found

Figure 3.



- False Crawls
- Nests*

Figure 4. Sea turtle nests and false crawls on the western Fort Morgan Peninsula, Alabama, 2003.

* original locations

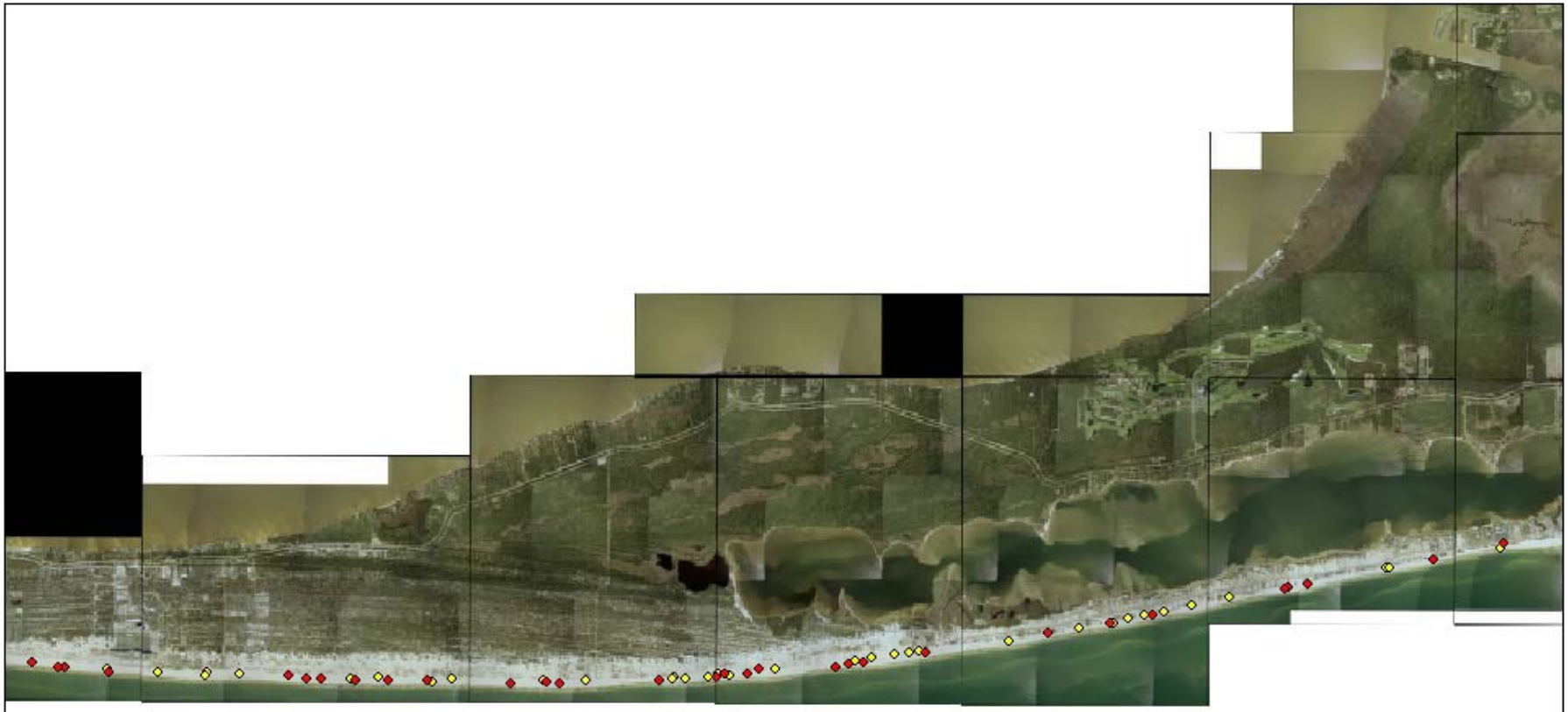


Figure 5. Sea turtle nests and false crawls on the eastern Fort Morgan Peninsula and Laguna Key area, Alabama, 2003.

* original locations

Figure 6. Sea turtle nests and false crawls in the West Beach and Gulf State Park areas, Alabama, 2003.

* original locations

- False Crawls
- Nests*

Figure 7. Sea turtle nests and false crawls in Orange Beach, Alabama, 2003.

* original nest locations

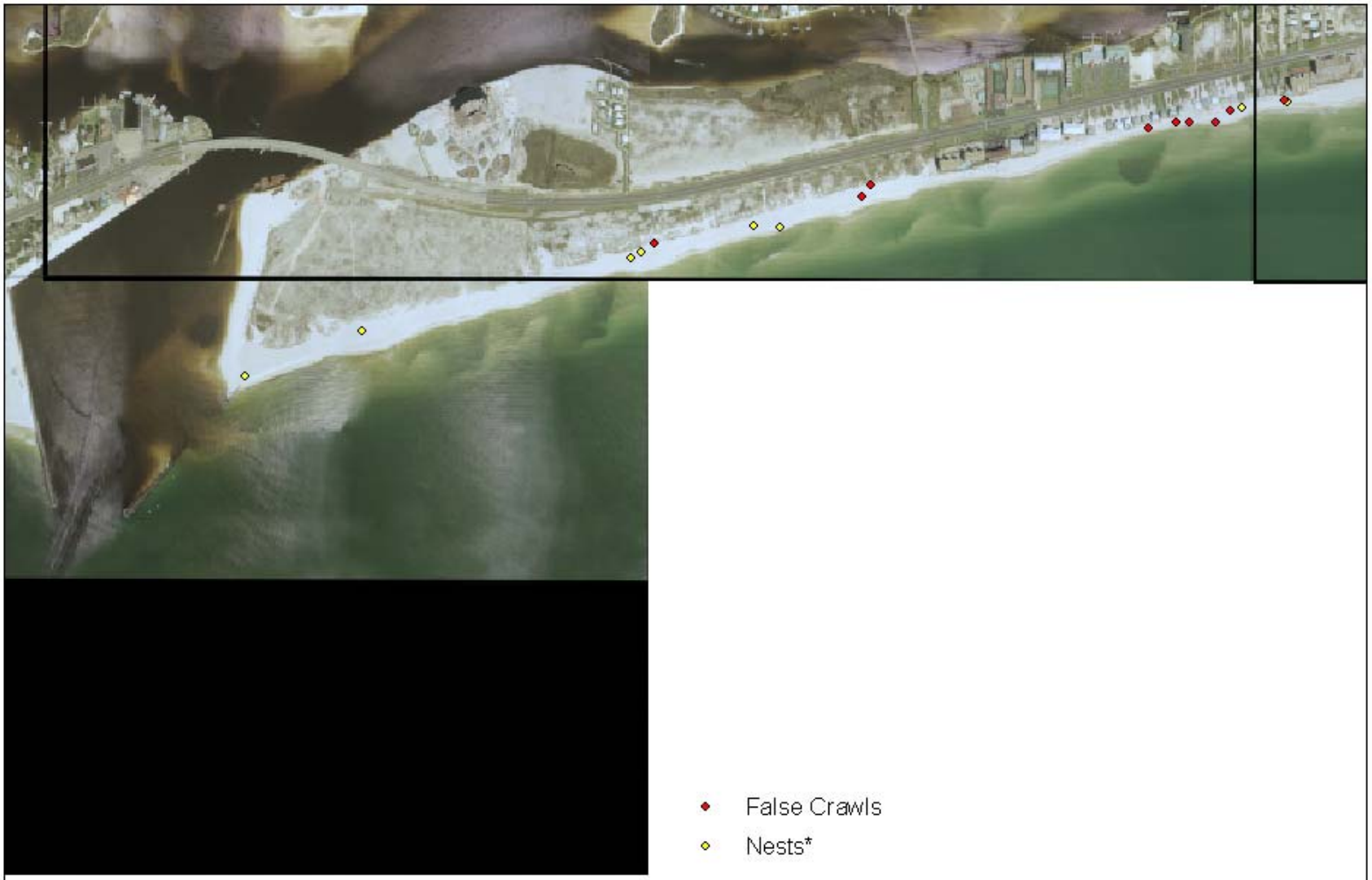


Figure 8. Sea turtle nests and false crawls in the Alabama Point area, Alabama, 2003.

* original nest locations